

BACKGROUND

The long-term objective of the U.S. AMLR field research program is to describe the functional relationships between Antarctic krill (*Euphausia superba*), their predators, and key environmental variables. The field program is based on two working hypotheses: (1) krill predators respond to changes in the availability of their food source; and (2) the distribution of krill is affected by both physical and biological aspects of their habitat. To refine these hypotheses a study area was designated in the vicinity of Elephant, Clarence, and King George Islands, and a field camp was established at Seal Island, a small island off the northwest coast of Elephant Island. From 1989-1996, shipboard studies were conducted in the study area to describe variations within and between seasons in the distributions of nekton, zooplankton, phytoplankton, and water zones. Complementary reproductive and foraging studies on breeding pinnipeds and seabirds were also accomplished at Seal Island.

Beginning in the 1996/97 season, the AMLR study area was expanded to include a large area around the South Shetland Islands, and a new field camp was established at Cape Shirreff, Livingston Island (Figure 1). Research at Seal Island was discontinued due to landslide hazards. Shipboard surveys of the pelagic ecosystem in the expanded study area are accomplished each season, as are land-based studies on the reproductive success and feeding ecology of pinnipeds and seabirds at Cape Shirreff.

The region-wide survey designs (Legs I and II, Surveys A and D respectively) in the vicinity of Elephant, Clarence, King George and Livingston Islands are described in Figure 2. Stations located to the west of Livingston and King George Islands are designated the "West Area", those to the south of King George Island are designated the "South Area", those around Elephant Island are designated the "Elephant Island Area", and those south of Elephant Island are designated the "Joinville Island Area". The survey grid was expanded this year to include stations in the Joinville Island Area in order to understand the dynamics and influences of the Weddell Sea on the AMLR survey area.

This is the 14th issue in the series of AMLR field season reports.

SUMMARY OF 2002 RESULTS

The Russian R/V *Yuzhmorgeologiya* was chartered to support the U.S. AMLR Program during the 2001/02 field season. Shipboard operations included: 1) two region-wide surveys of krill and oceanographic conditions in the vicinity of the South Shetland Islands; 2) calibration of acoustic instrumentation at the beginning and end of survey operations; 3) a fur seal pup census at selected sites throughout the South Shetland Islands (Leg I); 4) a joint Zodiac/ship inshore survey of krill and oceanographic conditions near Cape Shirreff (Leg II); 5) deploying a buoy instrumented with acoustical sensors and buoy-to-shore telemetry in the vicinity of Cape Shirreff (Leg II); 6) collecting multi-scattering total target strength measurements of live animals (Leg II); and 7) shore camp support. Land-based operations at Cape Shirreff included: 1) observations of chinstrap, gentoo and Adélie penguin breeding colony sizes, foraging locations and depths, diet composition, breeding chronology and success, and fledging weights; 2) instrumentation of adult penguins to determine winter-time migration routes and foraging areas; 3) observations of